

Claims

What is claimed is:

1. A method for distributing processing among routing nodes capable of providing application level support during routing, the method comprising:

a) identifying processing resources required to provide application level support during routing for select traffic;

b) selecting at least one routing node capable of providing the processing resources required to provide the application level support for the select traffic; and

c) routing the select traffic through the at least one routing node capable of providing the processing resources required to provide the application level support,

wherein the at least one routing node provides the application level support for the select traffic while routing the select traffic.

2. The method of claim 1 wherein the at least one routing node is at least one of a plurality of routing nodes that can provide the application level support for the select traffic and the selecting step further comprises determining the at least one routing node from the plurality of routing nodes to provide the application level support in a manner to balance processing load among the plurality of routing nodes.

3. The method of claim 1 wherein the at least one routing node is at least one of a plurality of routing nodes that can provide the application level support for the select traffic and the selecting

step further comprises determining the at least one routing node from the plurality of routing nodes based on available processing capacity of the at least one routing node to provide the application level support.

4. The method of claim 1 wherein the at least one routing node is at least one of a plurality of routing nodes that can provide the application level support for the select traffic and the selecting step further comprises determining the at least one routing node from the plurality of routing nodes based on available processing capacity of the plurality of routing nodes and the at least one routing node to provide the application level support.

5. The method of claim 1 wherein the selecting step selects a plurality of routing nodes through which to route the select traffic to distribute the application level support for the select traffic and the routing step routes the select traffic to facilitate distribution of the application level support such that processing for the application level support is distributed among the plurality of routing nodes while routing the select traffic.

6. The method of claim 5 wherein the selecting step further comprises selecting the plurality of routing nodes within one routing path such that all of the select traffic is routed through each of the plurality of routing nodes and processing for the application level support is distributed among the

plurality of routing nodes while routing the select traffic.

5 7. The method of claim 5 wherein the selecting step further comprises selecting the plurality of routing nodes within different routing paths such that a different portion of the select traffic is routed through each of the plurality of routing nodes and processing for the application level support is distributed among the plurality of routing nodes while routing the select traffic.

15 8. The method of claim 7 wherein the selecting step further comprises selecting the plurality of routing nodes wherein at least two of the plurality of routing nodes are within one of the different routing paths such that processing for the application level support for the portion of the select traffic routed through the at least two of the plurality of routing nodes is distributed between the at least two of the plurality of routing nodes.

25 9. The method of claim 1 wherein the selecting step further comprises:
a) identifying possible routing paths between a source and destination for the select traffic, each of the possible routing paths including at least one routing node capable of providing the processing resources required to provide application level support for the select traffic;

- b) identifying a capacity of the at least one routing node in the possible routing paths to provide the processing resources; and
- c) determining at least one of the possible routing paths through which to route the select traffic based on the capacity of the at least one routing node in the possible routing paths to provide the processing resources.

10 10. The method of claim 9 further comprising allocating resources of the at least one routing node along the at least one of the possible routing paths to provide the processing for the application level support while routing.

15 11. The method of claim 1 wherein the selecting step further comprises:

- a) identifying possible routing paths between a source and destination for the select traffic, each of the possible routing paths including at least one routing node capable of providing the processing resources required to provide application level support for the select traffic;
- b) identifying capacities of a plurality of routing nodes among the possible routing paths to provide the processing resources; and
- c) determining at least one of the possible routing paths through which to route the select traffic based on the capacity of the plurality of routing nodes in the possible routing paths to provide the processing resources.

12. The method of claim 11 wherein the selecting step further comprises distributing processing among the plurality of routing nodes to provide the application level support for the select traffic.

5

13. A method for distributing processing among multiple routing devices capable of providing application level support, the method comprising:

- 10 a) determining processing resources necessary for application level support of traffic to be routed;
- b) monitoring available processing capacity available on a plurality of routing nodes capable of providing the application level support and routing the traffic;
- 15 c) identifying at least two of the routing nodes having combined processing capacity to provide the application level support necessary for the traffic to be routed; and
- 20 d) routing the traffic in a manner allowing the at least two routing nodes to provide the processing for the application level support.

14. The method of claim 13 further comprising
25 determining how to distribute the processing for the application level support among the at least two routing nodes based on the processing resources necessary for application level support.

30 15. The method of claim 14 further comprising reserving sufficient resources of the at least two routing nodes prior to routing to the at least two routing nodes to provide the processing capacity for the application level support necessary for the traffic.

16. A routing element facilitating distribution of application level processing during routing comprising a control system adapted to:

- 5 a) determine processing resources necessary for application level support of traffic to be routed;
- 10 b) monitor available processing capacity available on a plurality of routing nodes capable of providing the application level support and routing the traffic;
- 15 c) identify at least two of the routing nodes having combined processing capacity to provide the application level support necessary for the traffic to be routed; and
- 20 d) facilitate routing the traffic in a manner allowing the at least two routing nodes to provide the processing for the application level support.

17. The routing element of claim 16 wherein said control system is further adapted to determine how to distribute the processing for the application level support among the at least two routing nodes based on the processing resources necessary for the application level support.

18. The routing element of claim 17 wherein said control system is further adapted to reserve sufficient resources of the at least two routing nodes prior to routing to the at least two routing nodes to provide the processing capacity for the application level support necessary for the traffic.

19. A system for distributing processing among routing nodes capable of providing application level support during routing, the method comprising:

- 5 a) means for identifying processing resources required to provide application level support during routing for select traffic;
- 10 b) means for selecting at least one routing node capable of providing the processing resources required to provide the application level support for the select traffic; and
- c) means for routing the select traffic through the at least one routing node capable of providing the processing resources required to provide the application level support,

15 wherein the at least one routing node provides the application level support for the select traffic while routing the select traffic.

20 20. The system of claim 19 wherein the at least one routing node is at least one of a plurality of routing nodes that can provide the application level support for the select traffic and the means for selecting is capable of determining the at least one routing node from the plurality of routing nodes to provide the application level support in a manner to balance processing load among the plurality of routing nodes.

25 21. The system of claim 19 wherein the at least one routing node is at least one of a plurality of routing nodes that can provide the application level support for the select traffic and the means for selecting is capable of determining the at least one routing node from the plurality of routing nodes

30

based on available processing capacity of the at least one routing node to provide the application level support.

5 22. The system of claim 19 wherein the at least one routing node is at least one of a plurality of routing nodes that can provide the application level support for the select traffic and the means for selecting is capable of determining the at least one
10 routing node from the plurality of routing nodes based on available processing capacity of the plurality of routing nodes and the at least one routing node to provide the application level support.

15 23. The system of claim 19 wherein the means for selecting is capable of selecting a plurality of routing nodes through which to route the select traffic to distribute the application level support for the select traffic and the means for routing is capable of routing the select traffic to facilitate
20 distribution of the application level support such that processing for the application level support is distributed among the plurality of routing nodes while routing the select traffic.
25

30 24. The system of claim 23 wherein the means for selecting is capable of selecting the plurality of routing nodes within one routing path such that all of the select traffic is routed through each of the plurality of routing nodes and processing for the application level support is distributed among the plurality of routing nodes while routing the select traffic.

25. The system of claim 23 wherein the means for selecting is capable of selecting the plurality of routing nodes within different routing paths such that a different portion of the select traffic is routed through each of the plurality of routing nodes and processing for the application level support is distributed among the plurality of routing nodes while routing the select traffic.

26. The system of claim 25 wherein the means for selecting is capable of selecting the plurality of routing nodes wherein at least two of the plurality of routing nodes are within one of the different routing paths such that processing for the application level support for the portion of the select traffic routed through the at least two of the plurality of routing nodes is distributed between the at least two of the plurality of routing nodes.

27. The system of claim 19 wherein the means for selecting is capable of:

- a) identifying possible routing paths between a source and destination for the select traffic, each of the possible routing paths including at least one routing node capable of providing the processing resources required to provide application level support for the select traffic;
- b) identifying a capacity of the at least one routing node in the possible routing paths to provide the processing resources; and

c) determining at least one of the possible routing paths through which to route the select traffic based on the capacity of the at least one routing node in the possible routing paths to provide the processing resources.

28. The system of claim 27 further comprising means for allocating resources of the at least one routing node along the at least one of the possible routing paths to provide the processing for the application level support while routing.

29. The system of claim 19 wherein the means for selecting is capable of:

- a) identifying possible routing paths between a source and destination for the select traffic, each of the possible routing paths including at least one routing node capable of providing the processing resources required to provide application level support for the select traffic;
- b) identifying capacities of a plurality of routing nodes among the possible routing paths to provide the processing resources; and
- c) determining at least one of the possible routing paths through which to route the select traffic based on the capacity of the plurality of routing nodes in the possible routing paths to provide the processing resources.

30. The system of claim 29 wherein the means for selecting is capable of distributing processing among the plurality of the routing nodes to provide

the application level support for the select traffic.

- 5 31. A computer readable medium containing software for distributing processing among routing nodes capable of providing application level support during routing, the software comprising computer instructions to:
- 10 a) identify processing resources required to provide application level support during routing for select traffic;
- 15 b) select at least one routing node capable of providing the processing resources required to provide the application level support for the select traffic; and
- 20 c) facilitate routing of the select traffic through the at least one routing node capable of providing the processing resources required to provide the application level support, wherein the at least one routing node provides the application level support for the select traffic while routing the select traffic.
- 25 32. The computer readable medium of claim 31 wherein the at least one routing node is at least one of a plurality of routing nodes that can provide the application level support for the select traffic and the instructions to select at least one routing node are configured to determine the at least one routing
- 30 node from the plurality of routing nodes to provide the application level support in a manner to balance processing load among the plurality of nodes.

33. The computer readable medium of claim 31 wherein the at least one routing node is at least one of a plurality of routing nodes that can provide the application level support for the select traffic and the instructions to select at least one routing node are configured to determine the at least one routing node from the plurality of routing nodes based on available processing capacity of the at least one routing node to provide the application level support.
34. The computer readable medium of claim 31 wherein the at least one routing node is at least one of a plurality of routing nodes that can provide the application level support for the select traffic and the instructions to select at least one routing node are configured to determine the at least one routing node from the plurality of routing nodes based on available processing capacity of the plurality of routing nodes and the at least one routing node to provide the application level support.
35. The computer readable medium of claim 31 wherein the instructions to select at least one routing node are configured to select a plurality of routing nodes through which to route the select traffic to distribute the application level support for the select traffic and the instructions to route are configured to route the select traffic to facilitate distribution of the application level support such that processing for the application level support is distributed among the plurality of routing nodes while routing the select traffic.

36. The computer readable medium of claim 35 wherein the instructions to select at least one routing node are configured to select the plurality of routing nodes within one routing path such that all of the select traffic is routed through each of the plurality of routing nodes and the processing for the application level support is distributed among the plurality of routing nodes while routing the select traffic.

37. The computer readable medium of claim 35 wherein the instructions to select at least one routing node are configured to select the plurality of routing nodes within different routing paths such that a different portion of the select traffic is routed through each of the plurality of routing nodes and processing for the application level support is distributed among the plurality of routing nodes while routing the select traffic.

38. The computer readable medium of claim 37 wherein the instructions to select at least one routing node are configured to select the plurality of routing nodes wherein at least two of the plurality of routing nodes are within one of the different routing paths such that processing for the application level support for the portion of the select traffic routed through the at least two of the plurality of routing nodes is distributed between the at least two of the plurality of routing nodes.

30

39. The computer readable medium of claim 31 wherein the instructions to select at least one routing node are configured to:

- 5 a) identify possible routing paths between a source and a destination for the select traffic, each of the possible routing paths including at least one routing node capable of providing the processing resources required to provide the application level support for the select traffic;
- 10 b) identify a capacity of the at least one routing node in the possible routing paths to provide the processing resources; and
- 15 c) determine at least one of the possible routing paths through which to route the select traffic based on the capacity of the at least one routing node in the possible routing paths to provide the processing resources.

20 40. The computer readable medium of claim 39 wherein the software further comprises instructions to allocate resources of the at least one routing node along the at least one of the possible routing paths to provide the processing for the application level support while routing.

25 41. The computer readable medium of claim 31 wherein the instructions to select at least one routing node are configured to:

- 30 a) identify possible routing paths between a source and a destination for the select traffic, each of the possible routing paths including at least one routing node capable of providing the processing resources required to provide the application level support for the select traffic;

- b) identify capacities of a plurality of routing nodes among the possible routing paths to provide the processing resources; and
- c) determine at least one of the possible routing paths through which to route the select traffic based on the capacity of the plurality of routing nodes in the possible routing paths to provide the processing resources.

10 42. The computer readable medium of claim 41 wherein the instructions to select at least one routing node are configured to distribute processing among the plurality of the routing nodes to provide the application level support for the select traffic.

15 43. A computer readable medium containing software for distributing processing among multiple routing devices capable of providing application level support, the software comprising computer instructions to:

- a) determine processing resources necessary for application level support of traffic to be routed;
- b) monitor available processing capacity available on a plurality of routing nodes capable of providing the application level support and routing the traffic;
- c) identify at least two of the routing nodes having combined processing capacity to provide the application level support necessary for the traffic to be routed; and
- d) route the traffic in a manner allowing the at least two routing nodes to provide the processing for the application level support.

44. The computer readable medium of claim 43 wherein the software further comprises instructions to determine how to distribute the processing for the application level support among the at least two routing nodes based on the processing resources necessary for the application level support.

45. The computer readable medium of claim 44 wherein the software further comprises instructions to reserve sufficient resources of the at least two routing nodes prior to routing to the at least two routing nodes to provide the processing capacity for the application level support necessary for the traffic.

46. A routing element facilitating distribution of application level processing during routing comprising a control system adapted to:

a) identify processing resources required to provide application level support during routing for select traffic;

b) select at least one routing node capable of providing the processing resources required to provide the application level support for the select traffic; and

c) route the select traffic through the at least one routing node capable of providing the processing resources required to provide the application level support,

wherein the routing element provides the application level support for the select traffic while routing the select traffic.